



COPYRIGHT PROTECTION AND ENFORCEMENT IN THE METAVERSE: EMERGING CHALLENGES OF VIRTUAL ASSETS, NFTS AND AI-GENERATED CONTENT

A Doctrinal and Comparative Legal Analysis

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Abstract: The Metaverse is no longer a speculative idea confined to science fiction. It is emerging as a network of persistent, immersive and commercially valuable virtual environments built through a convergence of virtual reality, augmented reality, gaming engines, blockchain infrastructure, artificial intelligence and digital marketplaces. These virtual environments allow users to create avatars, trade digital goods, display artworks, organise virtual performances, construct virtual architecture and monetise token-linked assets. While such developments have opened new possibilities for creativity and commerce, they have also created difficult questions for copyright law. Traditional copyright doctrine was designed around identifiable authors, territorial infringement, clear copies of protected works and relatively stable licensing arrangements. The Metaverse disrupts these assumptions because copyrightable works may be created collaboratively, generated by artificial intelligence, embedded in virtual spaces, linked to non-fungible tokens or circulated through pseudonymous blockchain transactions. This paper examines whether the existing Indian copyright framework is adequate to address copyright protection and enforcement in the Metaverse. It analyses the copyrightability of virtual assets, authorship and ownership of user-generated content, NFT-related misconceptions, AI-generated works, fair dealing, platform liability, moral rights and cross-border jurisdiction. The paper adopts a doctrinal and comparative legal methodology, relying on Indian statutory provisions, leading Indian case law, selected foreign jurisprudence and international policy materials. It argues that India does not require an entirely separate copyright statute for the Metaverse at this stage, but it does require clearer interpretive guidance, platform governance standards, transparent licensing practices, creator-awareness mechanisms and cross-border cooperation. A balanced framework must protect creators without preventing legitimate remix culture, innovation and user participation in immersive digital environments.

Index Terms - Metaverse; Copyright; NFTs; Artificial Intelligence; Virtual Assets; User-Generated Content; Platform Liability; Indian Copyright Law; Moral Rights; Digital Enforcement.

I. INTRODUCTION

The Metaverse may be understood as an interconnected set of immersive digital environments in which users interact through avatars and participate in social, commercial, educational, entertainment and creative activities. Although the concept was popularised in literature and technology discourse long before the recent expansion of immersive platforms, its legal significance has increased due to the convergence of virtual reality, augmented reality, blockchain, non-fungible tokens and artificial intelligence. WIPO has recognised that virtual worlds and NFTs raise complex intellectual property issues because digital interactions increasingly blur the line between a copy, a token, a licence and a commercially exploitable asset [1].

Copyright law traditionally protects original expression fixed in a material or digital form. In India, the Copyright Act, 1957 protects literary, dramatic, musical and artistic works, cinematograph films and sound recordings. The bundle of exclusive rights under section 14 includes reproduction, issuance of copies, communication to the public, adaptation and translation. These rights appear capable of applying to many metaverse activities. However, practical enforcement is difficult because the relevant acts may occur through servers, platforms, smart contracts, blockchain wallets, immersive devices and user-generated spaces spread across different jurisdictions.

The central problem is not whether copyright law applies to the Metaverse. It plainly does. The more difficult question is how copyright law should identify the author, owner, infringer, forum and remedy where the relevant act takes place in a persistent, cross-border, platform-mediated and often pseudonymous virtual environment. This paper argues that existing copyright principles remain useful but require doctrinal adaptation, platform-level compliance duties and clearer contractual practices to remain effective in immersive digital economies.

II. RESEARCH QUESTIONS

This paper is guided by the following research questions: whether the existing Indian copyright framework is adequate to protect virtual assets and user-generated works in the Metaverse; how authorship and ownership should be determined in relation to avatars, virtual goods, AI-generated works and NFT-linked assets; whether NFT ownership should be treated separately from copyright ownership; how platform liability and jurisdiction should be addressed in cases of metaverse copyright infringement; and what regulatory and policy reforms are required for India to respond effectively to copyright violations in immersive digital environments.

III. RESEARCH METHODOLOGY

The paper adopts a doctrinal and comparative legal research methodology. The doctrinal component analyses statutory provisions of the Copyright Act, 1957, the Information Technology Act, 2000 and relevant Indian case law on originality, authorship, fair dealing, moral rights and online intermediary liability. The comparative component refers to selected international materials, including WIPO policy discussions, United States jurisprudence on platform liability and AI authorship, and European regulatory developments concerning digital services and artificial intelligence. The study is primarily qualitative and analytical. It does not conduct empirical field research, but it relies on legal sources, policy materials and technology-specific examples to identify regulatory gaps and propose reform-oriented solutions.

IV. LITERATURE REVIEW

Academic and policy literature on the Metaverse generally identifies three recurring themes. First, scholars describe the Metaverse as an extension of the internet into persistent, immersive and economically active virtual spaces. Matthew Ball treats the Metaverse not as a single platform, but as a broad network of interoperable real-time 3D environments that may support a functioning economy [2]. This understanding is important for copyright law because the Metaverse is not merely a new website; it is a commercial and creative infrastructure in which users may produce, trade and perform copyrightable works.

Secondly, intellectual property literature has increasingly focused on NFTs and digital scarcity. NFTs can create a record of ownership over a token, but the token is not the same as copyright in the underlying work. WIPO and other policy bodies have noted that creators and consumers frequently misunderstand this distinction [1]. The legal uncertainty is intensified when an NFT is used to represent virtual art, music, gaming assets, avatar skins or digital fashion within virtual worlds.

Thirdly, scholarship on artificial intelligence raises questions about authorship and originality. Copyright law is historically built around human creativity, but AI systems are now capable of generating images, music, textures, scripts, voices and virtual characters. In India, the provision concerning computer-generated works identifies the author as the person who causes the work to be created, but the practical application of this rule to generative AI remains uncertain. The literature therefore suggests that the Metaverse does not make copyright obsolete; rather, it exposes the limitations of doctrines that depend on territoriality, identifiable authorship, clear licensing chains and stable copies of works.

V. COPYRIGHTABLE SUBJECT MATTER IN THE METAVERSE

The first step in analysing copyright in the Metaverse is to identify the kinds of works that may attract protection. A virtual world is built from software code, databases, images, sounds, animations, scripts, audiovisual sequences, textures, maps, architectural models, interface elements and user-created objects. Many of these elements may fall within recognised categories of protected works under the Copyright Act, 1957. Computer programs are expressly included within literary works, while visual and graphic elements

may qualify as artistic works. Sound recordings, musical works and cinematograph elements may also be embedded within virtual performances or immersive experiences.

Indian copyright law follows a relatively modest threshold of originality, but the work must involve skill, judgment and a minimum degree of creativity. In *Eastern Book Company v. D.B. Modak*, the Supreme Court rejected a purely “sweat of the brow” standard and held that originality requires the exercise of skill and judgment with a flavour of creativity [3]. This standard can be applied to virtual assets. A generic cube, standard wall texture or automated template may not always satisfy originality, but a creatively designed avatar, virtual sculpture, digital garment, 3D building or immersive audiovisual environment may qualify for copyright protection.

The doctrine of idea-expression dichotomy remains equally important. Copyright does not protect the general idea of a virtual marketplace, a fantasy castle, a gaming skin or a digital festival. It protects the particular expression of those ideas. The Supreme Court in *R.G. Anand v. Deluxe Films* emphasised that copyright does not subsist in ideas, themes, plots or facts, but in their expression [4]. This principle is essential in the Metaverse because many virtual environments may share common themes, genres and design conventions. Protection must not become so broad that it prevents legitimate creativity and competition.

VI. AUTHORSHIP AND OWNERSHIP OF USER-GENERATED CONTENT

User-generated content is central to the Metaverse. Users may create virtual homes, clothing, artwork, avatars, performances and interactive spaces. The default rule under section 17 of the Copyright Act is that the author of the work is the first owner of copyright, subject to statutory exceptions and contractual arrangements. Therefore, a user who independently creates a copyrightable virtual asset may ordinarily claim authorship and ownership unless platform terms or employment/commissioning arrangements provide otherwise.

Ownership may be shaped by three layers: copyright law, platform terms of service and private licensing agreements. A platform may not automatically become the copyright owner merely because a work is created within its ecosystem, but its terms may grant it a broad licence to host, reproduce, display, modify, distribute or monetise the content. The fairness and transparency of such terms become crucial where ordinary users do not understand the difference between retaining copyright and granting a broad, perpetual and worldwide licence to the platform.

The position becomes more complicated when multiple users collaborate or when a virtual asset incorporates pre-existing works. For example, a user who creates a virtual gallery using copyrighted paintings without permission may infringe the copyright in those paintings even if the virtual gallery layout is independently creative. Similarly, an avatar based on a famous fictional character may raise copyright, trademark and passing-off concerns. The Metaverse therefore requires careful licensing chains and clear disclosure of rights at the point of creation and commercialisation.

VII. NFTS AND THE MISCONCEPTION OF COPYRIGHT OWNERSHIP

Non-fungible tokens have become a major part of digital asset markets. An NFT is usually a blockchain-based token that points to or represents a unique digital asset, but it does not automatically transfer copyright in the underlying work. This distinction is legally crucial. Buying an NFT is generally comparable to acquiring a tokenised certificate or limited digital entitlement, unless the terms expressly transfer or license copyright. Under Indian copyright law, assignment of copyright must generally be in writing and must specify the rights assigned, duration and territorial extent [5]. Therefore, a mere NFT sale, without an express written assignment, should not be treated as transfer of copyright.

NFT markets also create infringement risks. A person may mint another artist’s painting as an NFT without permission, upload a copyrighted photograph into a virtual gallery, or sell token-linked avatars based on protected characters. The *MetaBirkins* dispute, though primarily a trademark case, illustrates how virtual goods can be commercially significant and legally contested when digital assets imitate recognised luxury products [6]. Similarly, NFT-related disputes involving pre-existing film or artistic works demonstrate that tokenisation does not avoid ordinary intellectual property rules.

For India, the most important regulatory point is clarity. NFT marketplaces should be required, or at least strongly encouraged, to disclose whether the purchaser receives only the token, a limited personal licence, a commercial licence or a copyright assignment. Without such disclosures, consumers may mistakenly believe that ownership of the token equals ownership of the underlying copyright. Such misunderstanding may increase infringement, mis-selling and contractual disputes.

VIII. AI-GENERATED CONTENT IN THE METAVERSE

Artificial intelligence significantly intensifies copyright problems in the Metaverse. AI tools can generate landscapes, character designs, background music, architecture, dialogue, voice clones, animations and virtual influencers. These outputs may be used inside immersive environments without a clear understanding of who owns them. Indian copyright law does not presently contain a comprehensive framework for AI-generated works. In relation to computer-generated literary, dramatic, musical or artistic works, the author is the person who causes the work to be created. However, generative AI complicates this rule because the output may be shaped by the model developer, the prompt user, the platform, the dataset and automated system choices.

The United States Copyright Office has taken the position that copyright registration requires human authorship and that works containing AI-generated material may be protected only to the extent of human creative contribution [7]. Although this position is not binding in India, it reflects a wider global trend that copyright protection should not be granted to purely machine-generated output without identifiable human creativity. Indian law will eventually need to clarify whether prompt engineering, selection, arrangement, editing or post-processing is sufficient human contribution for copyright protection.

AI also raises input-side infringement issues. Metaverse assets may be generated by models trained on copyrighted images, music or 3D assets. If training data is scraped without permission, or if outputs substantially resemble protected works, disputes may arise. Indian law does not yet provide a clear fair dealing exception for large-scale AI training. Therefore, courts may have to apply existing principles of reproduction, adaptation, substantial similarity and fair dealing to technologically complex facts.

IX. COPYRIGHT INFRINGEMENT IN VIRTUAL ENVIRONMENTS

Copyright infringement in the Metaverse may occur in several ways. First, a user may reproduce a copyrighted work by uploading it into a virtual space. Secondly, a user may communicate a copyrighted work to the public by displaying, streaming or performing it in a virtual environment. Thirdly, a user may create an unauthorised adaptation, such as a 3D version of a protected 2D artwork. Fourthly, a user may distribute infringing copies through NFT marketplaces or virtual stores. Fifthly, a platform may facilitate infringement by providing tools, storage, search visibility and commercial infrastructure.

The difficulty is that infringement may be technologically layered. A virtual object may be stored on a server, referenced by a blockchain token, rendered through a game engine, displayed through a headset and traded through a marketplace. Each step may involve reproduction, storage, communication or commercial dealing. Indian copyright law provides civil remedies such as injunctions, damages, accounts of profits and delivery-up of infringing copies, and criminal remedies may also be available in appropriate cases [8]. However, enforcement in the Metaverse may require evidence of wallet identity, server location, transaction history, platform control and user intent.

The Indian judiciary has already developed remedies for digital infringement in other contexts. Dynamic injunctions and John Doe orders have been used to address online piracy, mirror websites and unknown infringers. In *UTV Software Communication Ltd. v. 1337X.to*, the Delhi High Court recognised the need for effective remedies against rogue websites in online copyright infringement [9]. Similar logic may be extended to persistent virtual spaces, NFT marketplaces and repeat infringers operating under pseudonymous identities.

X. FAIR DEALING, TRANSFORMATIVE USE AND VIRTUAL CREATIVITY

Fair dealing will be a recurring defence in metaverse disputes. Under Indian law, fair dealing is permitted for specified purposes such as private or personal use, research, criticism, review, reporting of current events and certain educational uses [10]. The Delhi High Court's decision in the DU photocopy case emphasised access to education and the importance of interpreting statutory exceptions contextually [11]. However, Indian law does not contain a broad American-style open-ended fair use provision.

The challenge is that metaverse culture is often remix-based. Users transform, parody, reconstruct or re-contextualise existing works. Some uses may be expressive and non-substitutive; others may be commercial and market-harming. Indian courts will have to examine factors such as purpose, character, amount used, market substitution and the commercial nature of the virtual activity, even though these factors are not codified in the same manner as United States fair use law.

A cautious balance is necessary. Excessively strict enforcement may suppress legitimate fan creativity, parody, education and transformative virtual expression. Conversely, overly broad exceptions may undermine creators' markets in digital art, music, gaming assets and virtual experiences. Platform policies should therefore provide accessible copyright guidance and internal dispute resolution mechanisms instead of relying only on automatic takedowns.

XI. PLATFORM LIABILITY AND INTERMEDIARY RESPONSIBILITY

Metaverse platforms are not passive spaces. They design the environment, provide creation tools, host content, moderate conduct, operate marketplaces, take commissions and algorithmically promote content. This raises the question whether platform operators should be liable for user infringement. Under Indian law, intermediary safe harbour is governed primarily by section 79 of the Information Technology Act, 2000, subject to due diligence and lack of active participation. In *Shreya Singhal v. Union of India*, the Supreme Court clarified important aspects of intermediary liability and notice-based obligations [12].

For copyright, the platform's conduct should matter. A platform that merely hosts user content and responds expeditiously to valid takedown notices may deserve protection. A platform that curates, recommends, monetises and knowingly promotes infringing assets may be treated differently. The United States cases of *Napster* and *Grokster* demonstrate how contributory or inducement-based liability may arise where a service knowingly facilitates infringement or encourages infringing use [13]. Although Indian law differs, the underlying principle remains relevant: platform design and conduct should influence liability.

India should develop metaverse-specific platform governance norms requiring clear IP policies, repeat-infringer rules, verified rights-holder mechanisms, takedown-and-counter-notice procedures, asset provenance tools and audit trails for commercial virtual goods. Such rules need not destroy innovation; they can increase trust and reduce litigation.

XII. JURISDICTION AND CROSS-BORDER ENFORCEMENT

Jurisdiction is one of the most difficult issues in metaverse copyright enforcement. Copyright law is territorial, but metaverse interactions are borderless. A user in India may upload a copyrighted artwork to a platform incorporated in the United States, hosted on servers in Singapore, accessed by users in Europe and monetised through a blockchain wallet. Traditional territorial tests become strained in such circumstances.

Indian courts have considered online jurisdiction in intellectual property cases through the lens of targeting, purposeful availment and cause of action. In *Banyan Tree Holding v. A. Murali Krishna Reddy*, the Delhi High Court held that mere accessibility of a website may not be sufficient; there must be purposeful targeting of users within the forum [14]. This reasoning can be adapted to metaverse disputes. Courts may examine whether the virtual asset was offered to Indian users, priced in Indian currency, promoted to Indian consumers, or caused commercial harm within India.

Blockchain-based assets complicate enforcement because records may be decentralised and pseudonymous. Injunctions against identifiable platforms may be effective, but orders against unknown wallet holders may require cooperation from marketplaces, exchanges and intermediaries. Courts may increasingly need hybrid remedies combining disclosure orders, asset-freezing directions, dynamic injunctions and cross-border cooperation.

XIII. MORAL RIGHTS IN THE METAVERSE

Moral rights deserve special attention. Section 57 of the Copyright Act protects the author's right of paternity and integrity, including the right to claim authorship and restrain distortion, mutilation or modification prejudicial to honour or reputation. In the Metaverse, moral rights may be violated when an artist's work is modified, stripped of attribution, placed in an objectionable context or used to create distorted digital replicas. The Delhi High Court's recognition of moral rights in *Amar Nath Sehgal v. Union of India* reflects the continuing significance of authorial dignity beyond economic rights [15].

For example, a digital artist's sculpture may be imported into a virtual world and altered into a defamatory or obscene form. A musician's composition may be attached to a virtual political event without consent. A virtual replica of a mural may be modified in a manner prejudicial to the artist's reputation. These examples show that moral rights may become more important, not less, in immersive digital spaces because the social meaning of a work can be transformed by its virtual context.

XIV. REGULATORY GAPS IN INDIA

India currently has no dedicated metaverse legislation. This is not necessarily a defect, because technology-specific laws can quickly become obsolete. However, the absence of guidance creates uncertainty for creators, platforms and investors. Existing law is distributed across the Copyright Act, Information Technology Act, contract law, consumer protection law, data protection principles and financial regulation. This fragmented approach may be insufficient where a single virtual asset raises issues of copyright, tokenisation, platform liability, consumer deception and cross-border enforcement.

Virtual assets also intersect with cryptocurrency and token regulation. India has not enacted a comprehensive statute governing all crypto assets or NFTs as intellectual property-linked instruments. Where tokens are freely transferable and commercially traded, questions may arise under securities, taxation and consumer protection law. However, NFTs should not be treated merely as financial or technological objects.

NFT-linked works must also be examined through copyright ownership, assignment, licensing and moral rights principles.

A regulatory framework should clarify that token transfer does not equal copyright transfer, that AI-generated content requires disclosure where copyright is claimed, and that platforms must provide accessible IP complaint procedures. Such guidance may be issued through policy documents, model platform standards, amendments to rules or judicial interpretation before any comprehensive metaverse legislation is attempted.

XV. SUGGESTIONS AND RECOMMENDATIONS

India should issue official copyright guidelines for virtual assets, clarifying protection of avatars, 3D models, virtual architecture, digital fashion, virtual performances and NFT-linked works. Platform terms of service should distinguish clearly between ownership, licence, assignment and commercial exploitation rights in user-generated content. NFT marketplaces should display standard copyright notices stating whether the buyer receives only the token, a limited licence or an assignment of copyright.

Metaverse platforms should adopt notice-and-takedown, counter-notice and repeat-infringer policies specifically for virtual assets and immersive environments. AI-generated content used in commercial virtual spaces should be accompanied by disclosure of AI use and identification of human creative contribution wherever copyright is claimed. Digital watermarking, provenance metadata and blockchain records should be encouraged as evidentiary tools, but they should not be treated as conclusive proof of copyright ownership.

Indian courts should adapt dynamic injunctions and John Doe orders for virtual worlds, NFT marketplaces and blockchain-linked infringement. International cooperation should be strengthened because metaverse infringement is often cross-border and cannot be solved by territorial remedies alone. Legal education and creator-awareness programmes should explain that ownership of a digital file, token or virtual object is not the same as ownership of copyright.

XVI. CONCLUSION

The Metaverse presents a new technological setting for old and unresolved copyright questions. It does not abolish copyright law; rather, it tests the ability of copyright doctrine to respond to immersive, participatory, decentralised and AI-assisted digital environments. Indian copyright law is broad enough to protect many virtual assets, but it is not yet sufficiently clear on ownership of user-generated content, AI-generated works, NFT-linked assets, platform liability and cross-border enforcement.

The central argument of this paper is that India does not need an entirely separate copyright statute for the Metaverse at this stage. Instead, it requires a calibrated framework combining existing copyright principles with targeted interpretive guidance, platform regulation, contractual transparency, technological evidence tools and international cooperation. Copyright protection must be strong enough to protect creators, but flexible enough to allow innovation, parody, education, remix culture and legitimate virtual expression.

If addressed thoughtfully, copyright law can support a fair and innovative metaverse economy. If ignored, the Metaverse may become a space where creators lose control over their works, consumers misunderstand their rights, and platforms profit from legal uncertainty. The future of copyright in the Metaverse will therefore depend on how effectively law, technology and governance are brought into conversation with each other.

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